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U.S. FOREST SERVICE
Research Paper PNW- 56

Volume and Taper Tables

For

Red Alder

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PACIFIC NORTHWEST
FOREST AND RANGE EXPERIMENT STATION
U.S. DEPARTMENT OF AGRICULTURE · FOREST SERVICE

1968

U. S. DEPT. OF AGRICULTURE
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AUG 21 1968

CURRENT SERIAL RECORDS

INTRODUCTION

Red alder is a species of increasing importance in the Pacific Northwest. Interest in improved volume tables for the species resulted in publication of the 1949 volume tables (Johnson et al, 1949; Skinner 1959). More recently, Browne (1962) published cubic-foot-volume tables for red alder in British Columbia, and Hoyer (1966) presented tarif access tables, based on the 1949 tables, for use with the general tarif tables of Turnbull et al. (1963).

This paper presents new volume and taper tables for red alder. These form a unified system, permitting computation of cubic- and board-foot volumes for alternative assumed scaling practices and limits of merchantability.

DATA

Basic data used in construction of these tables consisted of (1) tree measurement data from Oregon, Washington, and British Columbia used in construction of the 1949 tables; (2) additional tree measurement data from Washington and Oregon contributed by Weyerhaeuser Co.; and (3) tree measurement data originally used for the volume tables published by Johnson et al. in 1926. After elimination of trees lacking measurements of upper stem diameters to less than 10 inches, having low forks or other gross abnormalities or apparent errors in recording of data, a total of 473 trees were available for the analysis (table 1).

METHODS

A report on the method of data analysis is planned for separate publication. Therefore, only an outline of the approach used is given in this paper.

Basically, the method consisted in deriving from the pooled tree measurement data an equation expressing squared diameter inside bark — (d.i.b.)² — as a function of the relative height at point of measurement, diameter outside bark at breast height (d.b.h.) and total height (H) of the tree.¹

Cubic volumes (CV) were then estimated by integration of the resulting equation. Estimates of upper stem diameter were obtained as the square root of the estimated (d.i.b.)². Board-foot volumes were estimated by applying assumed merchantability and scaling standards to the estimates of upper stem diameters. Equations were then developed for conversion of total cubic volume to merchantable cubic- and board-foot volumes.

¹ Since the principal intended use of the equation was in estimation of volume, using the relationship cubic volume = $k \int (d.i.b.)^2 dH$,

(d.i.b.)² rather than d.i.b. was considered the variable of primary interest.

RESULTS

CUBIC-VOLUME TABLE

Table 2 gives estimates of average cubic volume of red alder trees of specified d.b.h. and total height. Volumes are inside bark, from a stump of height in feet equal to $[\frac{1}{2} + (\frac{1}{2})(d.b.h./12)]^2$,² to the indicated inside bark (i.b.) top diameter limits of 12.0, 10.0, 8.0, 6.0, 4.0, and 0.0 inches. No trim allowance is made.

These estimates were obtained by integration of the estimating equation for (d.i.b)² from assumed stump height to heights corresponding to the indicated diameter limits.

TAPER TABLE

Table 3 gives estimated diameters inside bark of red alder trees of specified d.b.h. and total height, at intervals of 4.125 feet above stump height. Values given are square roots of the values of (d.i.b.)² predicted by the estimating equation. The height interval used provides trim allowance of 0.50 foot per 16 feet of bole.

VOLUME TABLES IN BOARD FEET

Tables 4, 5, and 6 give estimated average tree volume in board feet Scribner (SV) for stated assumed scaling lengths (8 and 16 feet), top diameter limits (12.0, 10.0, 8.0, and 6.0 inches i.b.), and diameter measurement practice ("nearest inch" versus rounding of fractional diameters to next lower exact inch). Volumes were obtained by applying the formula Scribner log rule (Bruce 1925) to estimated upper stem diameters (table 3), with trim allowance of 0.50 foot per 16 feet of merchantable stem and using, for top logs, estimated length (unrounded) to the stated top d.i.b. limit.

Use of formula rule rather than scale stick values eliminates the arbitrary and illogical jumps which result from rounding and the diagraming process. Volumes for measurement to "nearest inch" were obtained by using estimated top d.i.b. in the formula; volumes for measurement "rounding down" were obtained by using (d.i.b.— $\frac{1}{2}$) as the diameter in the formula. Since volume tables represent the means of many trees, smoothed values are appropriate.

Table 7, which gives estimated Scribner volumes by d.b.h. class and number of 16-foot logs, was prepared by graphical interpolation from values shown in tables 3 and 5.

Table 8 gives estimated tree volumes in board feet by International $\frac{1}{4}$ -inch rule, with the same assumed measurement practices used in table 4.

CHOICE OF TOP DIAMETER LIMIT

In application of either board-foot or merchantable cubic-volume tables, the choice of minimum top d.i.b. limit should be based on the user's estimate of the top d.i.b. to which average trees of the size under consideration can actually be utilized. This limit will vary with tree size, because of excessive branching in the tops of large trees. Thus, board-foot volume to a 6-inch top in a tree 24 inches d.b.h. is not a realistic estimate of the volume of material actually utilizable as sawtimber, even though smaller trees may be utilized to this limit.

² An arbitrary rule, which approximates average height of stumps as cut.

COMPARISON OF "ACTUAL" AND ESTIMATED VOLUMES

"Actual" cubic volume of sample trees was calculated by Smalian's formula (except with butt section treated as a neiloid) and the differences [$CV_{estimate} - CV_{actual}$], where estimated volume was CTV as shown in table 2, were expressed as percentages of estimated volume. The mean percentage difference, excluding 131 trees for which stump diameter had not been recorded, was -1 percent with standard deviation of 9 percent.

For a portion (139) of the sample trees, differences between estimated Scribner volume (SV8 in table 6) and "actual" Scribner volume were calculated. These, when expressed as percentages of estimated volume, had a mean of -0.8 percent and standard deviation of 15 percent.

TARIF ACCESS CURVES

Those wishing to use the tarif system for volume computation (Turnbull et al. 1963) can readily use table 2 as the basis for a tarif access table by means of the relationship

$$\text{tarif number} = \frac{0.913(CV4)}{(\text{basal area} - 0.087)}$$

given by Turnbull and Hoyer (1965).

Figure 1 is such an access table in graphical form.

COMPUTING EQUATIONS

The equations given below may be used for calculations on automatic data processing equipment.

1. Diameters inside bark may be estimated by the following equation, which is the basis of table 3.

$$\text{d.i.b.}_{est} = (\text{d.b.h.}) \sqrt{\left[\frac{(\text{d.i.b.})^2}{(\text{d.b.h.})^2} \right]_{est}}$$

where

$$\begin{aligned} \left[\frac{(\text{d.i.b.})^2}{(\text{d.b.h.})^2} \right]_{est} &= 0.91274(x)^{1.5} - 1.9758(x^{1.5}-x^3)(\text{d.b.h.})(10^{-2}) \\ &\quad + 8.2375(x^{1.5}-x^3)(H)(10^{-3}) - 4.964(x^{1.5}-x^{32})(H)(\text{d.b.h.})(10^{-5}) \\ &\quad + 3.773(x^{1.5}-x^{32})(H)^{0.5}(10^{-3}) - 7.417(x^{1.5}-x^{40})(H)^2(10^{-6}) \end{aligned}$$

in which

H = total height of tree,

d.b.h. = diameter outside bark at breast height,

and

$$x = \frac{(\text{distance from tip to estimated d.i.b.})}{(H-4.5)}$$

The ratio $(\text{d.i.b.})^2/(\text{d.b.h.})^2$ has a standard error of estimate of approximately 0.07.

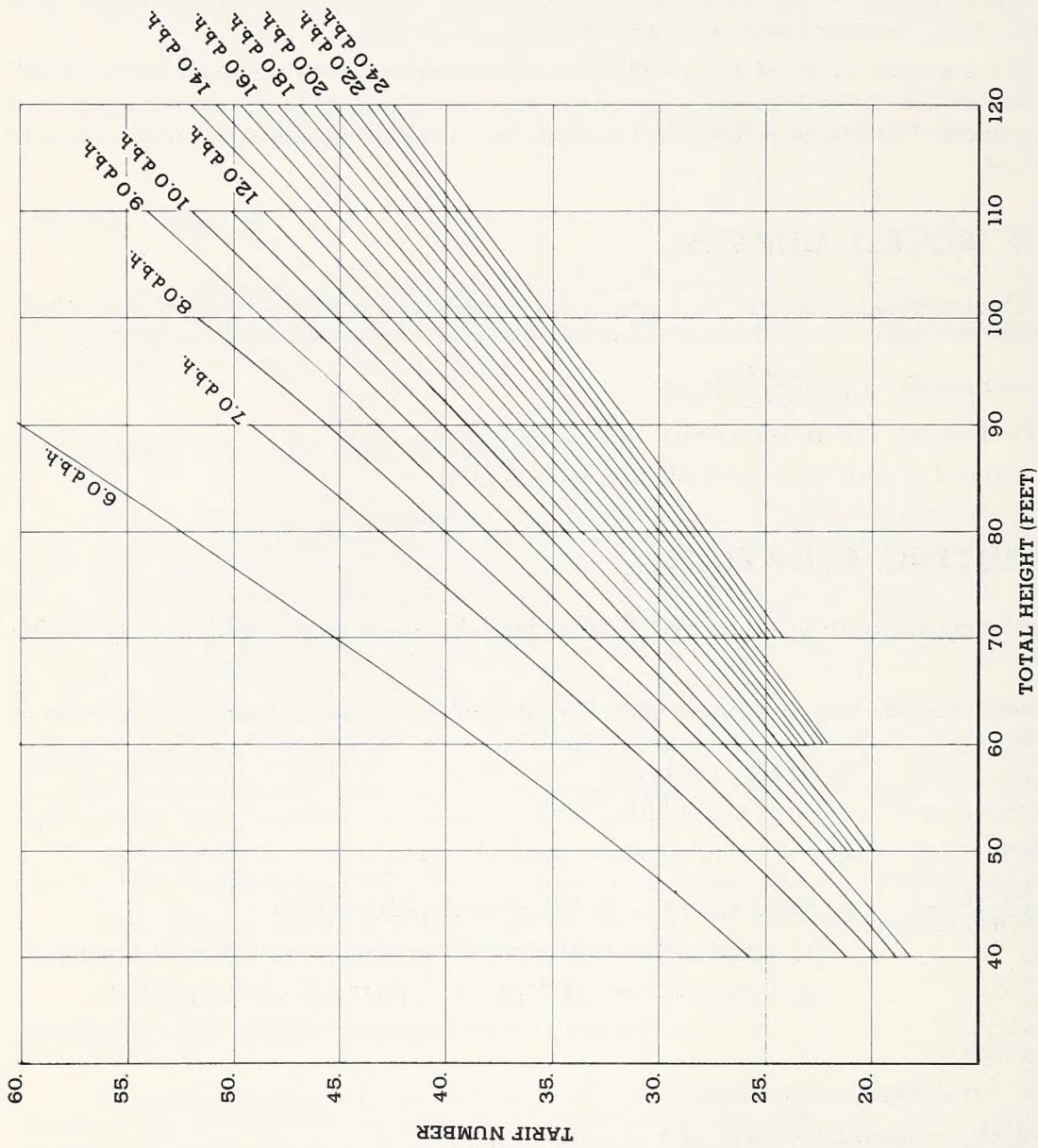


Figure 1. --Graph for estimating tariff number of red alder from d.b.h. and total height.

2. The basic equation for total cubic volume above stump (CVT), derived from (1), is:

$$CVT = 0.00545415 (d.b.h.)^2(H-4.5) (F)$$

where³

$$\begin{aligned} F = & 0.36510(Z)^{2.5} - 7.9032(Z)^{2.5}(d.b.h.)(10^{-3}) + 3.2950(Z)^{2.5}(H)(10^{-3}) \\ & - 1.9856(Z)^{2.5}(H)(d.b.h.)(10^{-5}) - 2.9668(Z)^{2.5}(H)^2(10^{-6}) \\ & + 1.5092(Z)^{2.5}(H)^{0.5}(10^{-3}) + 4.9395(Z)^4(d.b.h.)(10^{-3}) \\ & - 2.05937(Z)^4(H)(10^{-3}) + 1.5042(Z)^{33}(H)(d.b.h.)(10^{-6}) \\ & - 1.1433(Z)^{33}(H)^{0.5}(10^{-4}) + 1.8090(Z)^{41}(H)^2(10^{-7}) \end{aligned}$$

in which

$$Z = \frac{(H - \frac{1}{2} - (d.b.h.)/24)}{(H - 4.5)} = \frac{\text{(total height above stump in feet)}}{\text{(total height above b.h. in feet)}}$$

3. The estimates of total cubic volume (CVT) for trees of specified d.b.h. and height (H) given by equation 2 above may be converted to merchantable cubic volumes to top diameters of 4, 6, 8, 10, and 12 inches i.b. (CV4, CV6, CV8, CV10, CV12) by multiplying estimated total cubic volume by the following conversion factors:

$$\begin{aligned} \frac{CV4}{CVT} &= 0.99875 - \frac{43.336}{(d.b.h.)^3} - \frac{124.717}{(d.b.h.)^4} + \frac{0.193437(H)}{(d.b.h.)^3} + \frac{479.83}{(d.b.h.)^3(H)} \\ \frac{CV6}{CVT} &= 1.00081 - \frac{1614.44}{(d.b.h.)^4} + \frac{2.86121(H)}{(d.b.h.)^4} + \frac{1686.7}{(H)^3} - \frac{21.7181}{(d.b.h.)(H)} + \frac{1.1028(10^5)}{(d.b.h.)^5(H)} \\ \frac{CV8}{CVT} &= 1.03361 - \frac{1.59234}{(d.b.h.)} - \frac{4667.04}{(d.b.h.)^4} + \frac{0.104498(H)}{(d.b.h.)^2} + \frac{5322.16}{(d.b.h.)^3(H)} \\ \frac{CV10}{CVT} &= 1.02328 - \frac{43.4570}{(d.b.h.)^2} - \frac{7626.29}{(d.b.h.)^4} + \frac{76.7229(H)}{(d.b.h.)^4} - \frac{9954.576(H)}{(d.b.h.)^6} + \frac{116766}{(d.b.h.)^4(H)} \\ \frac{CV12}{CVT} &= 1.21396 - \frac{10.24325}{(d.b.h.)} + \frac{6.54920}{(H)} + \frac{12.2606(H)}{(d.b.h.)^3} - \frac{46116.8(H)}{(d.b.h.)^6} - \frac{1145.61}{(d.b.h.)^2(H)} \end{aligned}$$

A similar set of conversion factors, some what less accurate but based on d.b.h. only, is given by the curves shown in figure 2.

These cubic-volume conversion factors, and the board-foot volume conversion factors of following sections, should of course *not* be applied to trees of dimensions too small to contain merchantable volume to the specified top diameter limit.

³ "F" is $\int_0^Z \left[\frac{(d.i.b.)}{(d.b.h.)} \right]^2 dx$, which is a form factor based on a cylinder of diameter equal to d.b.h. and height equal to (H-4.5).

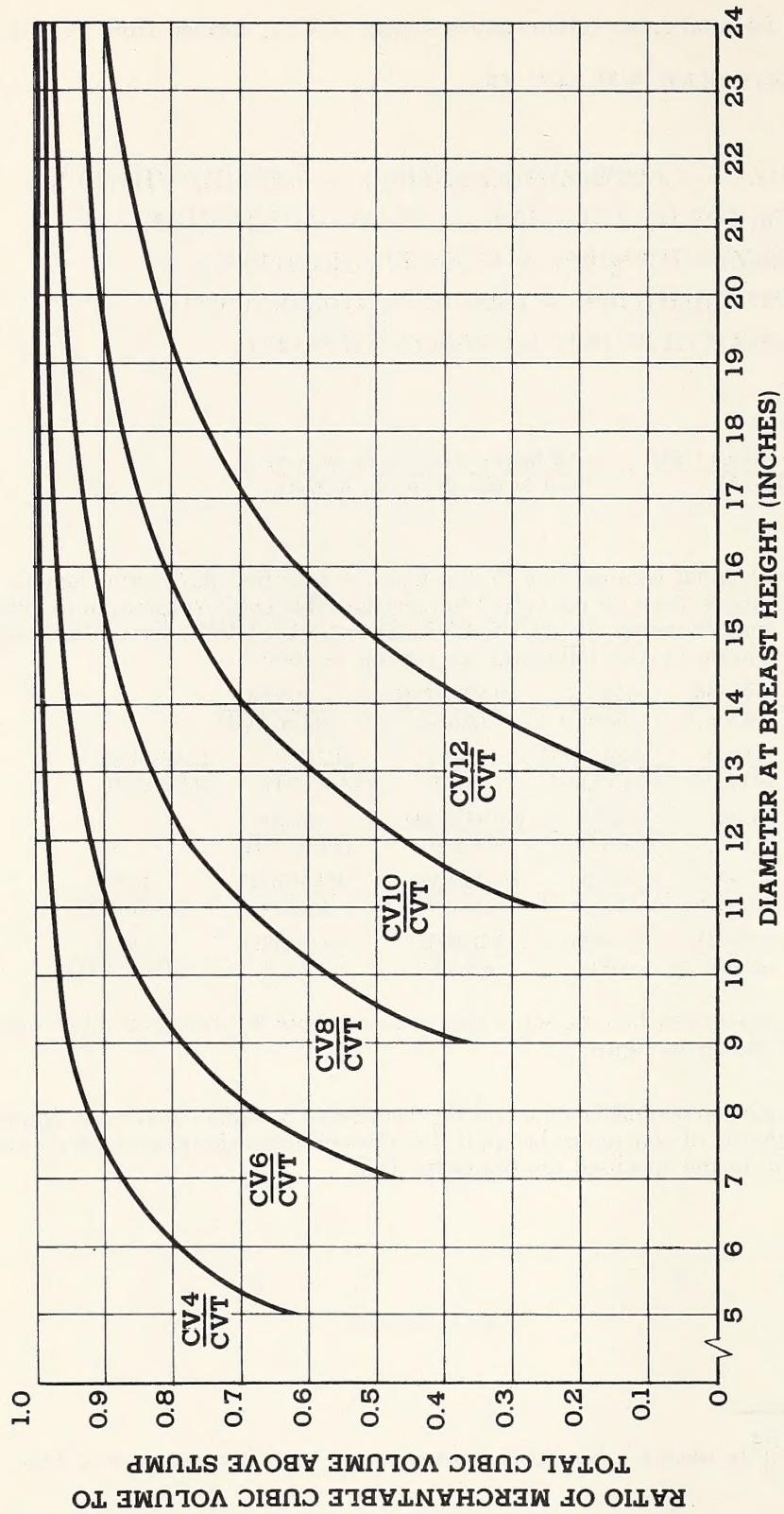


Figure 2.—Relationship of ratios of (merchantable cubic volume)/CV_T to tree d.b.h.

4. Total cubic-volume estimates (CVT) for saw-log-size trees of specified d.b.h. and H may be converted to board feet, Scribner, by multiplying by the conversion factors given below. Ratios are for board-foot volumes to tops of 6, 8, 10, and 12 inches i.b. (SV6, SV8, SV10, and SV12). Scaling is assumed to be in 16-foot logs, with fractional diameters rounded down to next lower exact inch, since this most nearly approximates current commercial practice.

$$\begin{aligned}\frac{\text{SV6}}{\text{CVT}} &= 8.36001 - \frac{30.3982}{D} - \frac{205.532}{H} - \frac{152.004}{D^2} + \frac{1674.00}{D^4} + \frac{1227.84}{DH} \\ \frac{\text{CV8}}{\text{CVT}} &= 8.11342 - \frac{398.033}{D^2} - \frac{218.418}{H} + \frac{76702.1}{H^3} - \frac{0.05208(H)}{D} + \frac{11337.8}{D^2H} - \frac{2.46759(10^7)}{D^6H} \\ \frac{\text{SV10}}{\text{CVT}} &= 7.76152 - \frac{16.6331}{(\text{d.b.h.})} - \frac{156.070}{(H)} - \frac{5845.33}{(\text{d.b.h.})^3} + \frac{2.29172(10^5)}{(\text{d.b.h.})^3(H)} - \frac{2.43897(10^8)}{(\text{d.b.h.})^8} \\ \frac{\text{SV12}}{\text{CVT}} &= 7.34627 - \frac{129.986}{(H)} - \frac{2.20502(H)(10^5)}{(\text{d.b.h.})^6} + \frac{7465.72}{(H)^2} - \frac{4082.55}{(\text{d.b.h.})(H)} + \frac{2.97332(10^6)}{(\text{d.b.h.})^4(H)}\end{aligned}$$

Total cubic-volume estimates (CVT) for saw-log-size trees of specified d.b.h. and H may be converted to board feet, International 1/4-inch rule, by multiplying by the conversion factors given below. Ratios are for board-foot volumes to tops of 6, 8, 10, and 12 inches i.b. (IV6, IV8, IV10, and IV12). Scaling is assumed to be in 16-foot logs, with fractional diameters rounded to the nearest inch.

$$\begin{aligned}\frac{\text{IV6}}{\text{CVT}} &= 8.22987 - \frac{189.164}{D^2} - \frac{5631.3}{D^4} - \frac{179.256}{H} + \frac{7977.6}{D^2H} + \frac{143.04(H)}{D^5} \\ \frac{\text{IV8}}{\text{CVT}} &= 8.30882 - \frac{190.146}{D^2} - \frac{21960.}{D^4} - \frac{191.413}{H} - \frac{1.211(10^6)}{H^4} + \frac{11281.}{D^2H} \\ \frac{\text{IV10}}{\text{CVT}} &= 8.24035 - \frac{7034.29}{D^3} - \frac{4.22367(10^8)}{D^8} - \frac{178.007}{H} + \frac{2.49955(10^5)}{D^3H} \\ \frac{\text{IV12}}{\text{CVT}} &= 7.84957 - \frac{51936.7}{D^2H} + \frac{398559.}{D^3H} - \frac{2.45274(10^5)(H)}{D^6} - \frac{130.245}{H} + \frac{7.299(10^6)}{H^4}\end{aligned}$$

Erratum: In the above equations D = d.b.h.

TABLE 1.--DISTRIBUTION OF SAMPLE TREES BY DIAMETER AND HEIGHT CLASSES.

DBH	TOTAL HEIGHT IN FEET												TOTAL FOR DBH CLASS
	20	30	40	50	60	70	80	90	100	110	120		
2	1	4	2	-	-	-	-	-	-	-	-	-	7
3	-	1	6	3	-	-	-	-	-	-	-	-	10
4	-	1	3	1	1	-	-	-	-	-	-	-	6
5	-	-	1	-	2	2	-	-	-	-	-	-	5
6	-	-	-	1	-	2	5	2	-	-	-	-	10
7	-	-	-	-	1	4	12	5	-	-	-	-	22
8	-	-	-	-	-	1	14	9	-	-	-	-	24
9	-	-	-	-	4	3	14	11	1	-	-	-	33
10	-	-	-	-	-	2	18	12	4	-	-	-	36
11	-	-	-	-	2	5	9	13	3	-	-	-	32
12	-	-	-	-	2	7	15	23	4	1	-	-	52
13	-	-	-	-	-	2	7	14	4	-	-	-	27
14	-	-	-	-	-	2	15	18	16	1	-	-	52
15	-	-	-	-	-	2	12	14	10	1	-	-	39
16	-	-	-	-	-	1	13	14	13	4	-	-	45
17	-	-	-	-	-	-	4	5	6	4	-	-	19
18	-	-	-	-	-	-	8	4	2	2	-	-	16
19	-	-	-	-	-	1	2	4	7	-	1	-	15
20	-	-	-	-	-	-	2	2	4	-	-	-	8
21	-	-	-	-	-	-	-	2	1	1	-	-	4
22	-	-	-	-	-	-	-	-	2	-	-	-	2
23	-	-	-	-	-	1	1	-	1	-	1	-	4
24	-	-	-	-	-	-	1	2	-	2	-	-	5
<hr/>													TOTAL NO. 473
TOTAL FOR HT CLASS	1	6	12	5	12	35	152	154	78	16	2		

TABLE 2.--VOLUME OF RED ALDER TREES IN CUBIC FEET INSIDE BARK (CV),
 FROM STUMP TO SPECIFIED MINIMUM TOP DIAMETER INSIDE BARK
 (DIB). STUMP HEIGHT = 0.5 FOOT + 0.5 x DBH. MERCHANTABLE
 VOLUMES OMITTED FOR TREES LESS THAN 6 INCHES DBH OR HAVING
 LESS THAN 8 LINEAL FEET OF MERCHANTABLE BOLE.

DBH	TOTAL HT	MINIMUM TOP DIB - INCHES					
		12.0 CV12	10.0 CV10	8.0 CV8	6.0 CV6	4.0 CV4	0.0 CVT
2	20	-	-	-	-	-	.216
2	30	-	-	-	-	-	.307
2	40	-	-	-	-	-	.404
3	20	-	-	-	-	-	.510
3	30	-	-	-	-	-	.690
3	40	-	-	-	-	-	.902
3	50	-	-	-	-	-	1.12
4	30	-	-	-	-	-	1.22
4	40	-	-	-	-	-	1.59
4	50	-	-	-	-	-	1.98
4	60	-	-	-	-	-	2.39
5	30	-	-	-	-	-	1.91
5	40	-	-	-	-	-	2.47
5	50	-	-	-	-	-	3.07
5	60	-	-	-	-	-	3.70
5	70	-	-	-	-	-	4.35
6	40	-	-	-	-	2.81	3.54
6	50	-	-	-	-	3.47	4.39
6	60	-	-	-	-	4.18	5.28
6	70	-	-	-	-	4.94	6.20
6	80	-	-	-	-	5.72	7.15
6	90	-	-	-	-	6.54	8.12
7	40	-	-	-	2.30	4.20	4.78
7	50	-	-	-	2.72	5.20	5.92
7	60	-	-	-	3.17	6.26	7.12
7	70	-	-	-	3.66	7.37	8.36
7	80	-	-	-	4.19	8.52	9.64
7	90	-	-	-	4.74	9.71	10.9

TABLE 2 (continued)

DBH	TOTAL HT	MINIMUM TOP DIB - INCHES					
		12.0 CV12	10.0 CV10	8.0 CV8	6.0 CV6	4.0 CV4	0.0 CVT
8	40	-	-	-	4.20	5.71	6.20
8	50	-	-	-	5.13	7.06	7.67
8	60	-	-	-	6.15	8.50	9.21
8	70	-	-	-	7.23	9.99	10.8
8	80	-	-	-	8.38	11.5	12
8	90	-	-	-	9.59	13.1	14.1
8	100	-	-	-	10.8	14.8	15.8
9	40	-	-	-	6.11	7.37	7.78
9	50	-	-	3.49	7.51	9.10	9.62
9	60	-	-	3.91	9.02	10.9	11.6
9	70	-	-	4.33	10.6	12.9	13.6
9	80	-	-	4.72	12.3	14.8	15.6
9	90	-	-	5.05	14.0	16.8	17.7
9	100	-	-	5.26	15.8	18.9	19.8
9	110	-	-	5.27	17.6	21.0	22.0
10	40	-	-	5.58	8.08	9.17	9.53
10	50	-	-	6.69	9.96	11.3	11.8
10	60	-	-	7.91	12.0	13.6	14.1
10	70	-	-	9.23	14.1	16.0	16.6
10	80	-	-	10.6	16.3	18.4	19.1
10	90	-	-	12.1	18.5	20.9	21.6
10	100	-	-	13.6	20.8	23.4	24.2
10	110	-	-	15.2	23.2	26.0	26.9
11	50	-	-	9.74	12.5	13.7	14.1
11	60	-	-	11.6	15.0	16.5	16.9
11	70	-	-	13.7	17.7	19.3	19.8
11	80	-	-	15.8	20.4	22.2	22.8
11	90	-	-	18.0	23.2	25.2	25.9
11	100	-	-	20.3	26.1	28.3	29.0
11	110	-	-	22.7	29.0	31.4	32.2
12	50	-	8.08	12.8	15.2	16.3	16.6
12	60	-	9.37	15.3	18.3	19.5	19.9
12	70	-	10.8	18.0	21.4	22.9	23.4
12	80	-	12.2	20.8	24.7	26.4	26.9
12	90	-	13.7	23.7	28.1	29.9	30.5
12	100	-	15.2	26.7	31.5	33.5	34.1
12	110	-	16.7	29.8	35.0	37.1	37.8

TABLE 2 (continued)

DBH	TOTAL HT	MINIMUM TOP DIB - INCHES					
		12.0 CV12	10.0 CV10	8.0 CV8	6.0 CV6	4.0 CV4	0.0 CVT
13	50	-	11.8	15.9	18.1	19.0	19.3
13	60	-	14.0	19.1	21.7	22.8	23.2
13	70	-	16.3	22.4	25.4	26.7	27.1
13	80	-	18.7	25.8	29.3	30.7	31.2
13	90	-	21.3	29.4	33.2	34.8	35.4
13	100	-	23.9	33.1	37.3	39.0	39.6
13	110	-	26.7	36.8	41.4	43.2	43.9
13	120	-	29.4	40.6	45.5	47.5	48.2
14	50	9.28	15.4	19.1	21.0	21.9	22.2
14	60	10.5	18.4	22.9	25.2	26.2	26.6
14	70	11.7	21.6	26.9	29.6	30.8	31.1
14	80	12.9	24.9	31.0	34.0	35.4	35.8
14	90	14.0	28.3	35.2	38.6	40.1	40.6
14	100	14.8	31.8	39.6	43.3	44.9	45.4
14	110	15.4	35.5	44.0	48.0	49.7	50.3
14	120	15.4	39.2	48.4	52.8	54.6	55.2
15	50	13.6	19.1	22.4	24.2	25.0	25.2
15	60	15.9	22.8	26.8	29.0	29.9	30.2
15	70	18.3	26.7	31.5	33.9	35.0	35.4
15	80	20.9	30.8	36.3	39.0	40.2	40.7
15	90	23.5	35.1	41.2	44.3	45.6	46.0
15	100	26.1	39.5	46.2	49.6	51.0	51.5
15	110	28.8	43.9	51.3	55.0	56.5	57.0
15	120	31.5	48.5	56.5	60.4	62.0	62.6
16	60	21.1	27.3	30.9	32.8	33.7	34.0
16	70	24.5	32.0	36.2	38.5	39.5	39.8
16	80	28.2	36.8	41.7	44.3	45.4	45.8
16	90	31.9	41.9	47.3	50.2	51.4	51.8
16	100	35.8	47.1	53.1	56.1	57.5	57.9
16	110	39.8	52.3	58.9	62.2	63.6	64.1
16	120	43.8	57.6	64.7	68.3	69.8	70.3
17	60	26.2	31.8	35.1	36.9	37.7	38.0
17	70	30.6	37.2	41.1	43.2	44.1	44.4
17	80	35.2	42.9	47.3	49.7	50.7	51.1
17	90	39.9	48.7	53.7	56.3	57.4	57.8
17	100	44.8	54.7	60.1	63.0	64.2	64.6
17	110	49.8	60.7	66.7	69.7	71.0	71.5
17	120	54.9	66.8	73.2	76.5	77.9	78.4

TABLE 2 (continued)

DBH	TOTAL HT	MINIMUM TOP DIB - INCHES					
		12.0 CV12	10.0 CV10	8.0 CV8	6.0 CV6	4.0 CV4	0.0 CVT
18	60	31.2	36.3	39.6	41.1	41.9	42.1
18	70	36.5	42.6	46.2	48.1	49.0	49.3
18	80	42.0	49.0	53.1	55.3	56.3	56.6
18	90	47.7	55.6	60.2	62.6	63.7	64.0
18	100	53.6	62.4	67.4	70.0	71.2	71.6
18	110	59.5	69.2	74.7	77.5	78.7	79.1
18	120	65.5	76.1	82.0	85.0	86.3	86.8
19	60	36.3	41.0	43.9	45.5	46.2	46.4
19	70	42.4	48.0	51.4	53.2	54.0	54.3
19	80	48.9	55.3	59.1	61.1	62.0	62.3
19	90	55.5	62.7	66.9	69.2	70.2	70.5
19	100	62.2	70.2	74.9	77.3	78.4	78.8
19	110	69.1	77.9	82.9	85.5	86.7	87.1
19	120	76.0	85.5	90.9	93.8	95.0	95.4
20	60	41.4	45.8	48.5	50.0	50.7	50.9
20	70	48.4	53.6	56.7	58.4	59.2	59.5
20	80	55.7	61.6	65.2	67.1	68.0	68.2
20	90	63.2	69.9	73.8	75.9	76.8	77.2
20	100	70.8	78.2	82.5	84.8	85.8	86.2
20	110	78.6	86.6	91.3	93.8	94.9	95.2
20	120	86.4	95.1	100.	103.	104.	104.
21	70	54.4	59.3	62.2	63.8	64.6	64.8
21	80	62.6	68.1	71.4	73.3	74.1	74.4
21	90	70.9	77.2	80.8	82.8	83.7	84.0
21	100	79.5	86.3	90.4	92.5	93.5	93.8
21	110	88.1	95.6	99.9	102.	103.	104.
21	120	96.8	105.	110.	112.	113.	113.
22	70	60.5	65.0	67.8	69.4	70.0	70.3
22	80	69.5	74.7	77.9	79.6	80.3	80.6
22	90	78.8	84.6	88.1	89.9	90.8	91.1
22	100	88.2	94.6	98.4	100.	101.	102.
22	110	97.6	105.	109.	111.	112.	112.
22	120	107.	115.	119.	121.	122.	123.
23	70	66.6	70.9	73.6	75.0	75.7	75.9
23	80	76.5	81.4	84.4	86.0	86.8	87.0
23	90	86.6	92.1	95.4	97.2	98.0	98.3
23	100	96.9	103.	107.	108.	109.	110.
23	110	107.	114.	118.	120.	121.	121.
23	120	118.	125.	129.	131.	132.	132.

TABLE 2 (continued)

DBH	TOTAL HT	MINIMUM TOP DIB - INCHES					
		12.0 CV12	16.0 CV10	8.0 CV8	6.0 CV6	4.0 CV4	0.0 CVT
24	70	72.8	76.9	79.4	80.8	81.4	81.7
24	80	83.6	88.2	91.1	92.6	93.3	93.6
24	90	94.6	99.8	103.	105.	105.	106.
24	100	106.	111.	115.	117.	118.	119.
24	110	117.	123.	127.	129.	130.	130.
24	120	128.	135.	139.	141.	142.	142.

TABLE 3.--TAPER TABLE FOR RED ALDER, BASED ON DIAMETER OUTSIDE BARK AT BREAST HEIGHT (DBH) AND TOTAL HEIGHT. VALUES ARE DIAMETERS INSIDE BARK IN INCHES, AT INDICATED HEIGHT ABOVE STUMP. STUMP HEIGHT = 0.5 foot + 0.5 x DBH. VALUES LESS THAN 4.0 OMITTED.

DBH	HEIGHT ABOVE STUMP	TOTAL HEIGHT OF TREE IN FEET								
		40	50	60	70	80	90	100	110	120
6	0.00	7.1	6.8	6.6	6.6	6.5	6.5	-	-	-
6	4.13	5.7	5.7	5.7	5.7	5.7	5.7	-	-	-
6	8.25	5.3	5.4	5.5	5.5	5.5	5.5	-	-	-
6	12.38	4.8	5.1	5.2	5.3	5.4	5.4	-	-	-
6	16.50	4.3	4.7	5.0	5.1	5.2	5.3	-	-	-
6	20.63	-	4.3	4.7	4.9	5.1	5.2	-	-	-
6	24.75	-	-	4.4	4.7	4.9	5.0	-	-	-
6	28.88	-	-	4.0	4.4	4.7	4.9	-	-	-
6	33.00	-	-	-	4.1	4.5	4.7	-	-	-
6	37.13	-	-	-	-	4.2	4.5	-	-	-
6	41.25	-	-	-	-	4.0	4.3	-	-	-
6	45.38	-	-	-	-	-	4.1	-	-	-
7	0.00	8.3	7.9	7.8	7.7	7.6	7.6	-	-	-
7	4.13	6.6	6.6	6.6	6.6	6.6	6.6	-	-	-
7	8.25	6.1	6.3	6.4	6.4	6.4	6.4	-	-	-
7	12.38	5.6	5.9	6.1	6.2	6.2	6.2	-	-	-
7	16.50	5.0	5.5	5.8	6.0	6.1	6.2	-	-	-
7	20.63	4.4	5.1	5.4	5.7	5.9	6.0	-	-	-
7	24.75	-	4.5	5.1	5.4	5.7	5.8	-	-	-
7	28.88	-	4.0	4.7	5.1	5.4	5.7	-	-	-
7	33.00	-	-	4.2	4.8	5.2	5.4	-	-	-
7	37.13	-	-	-	4.4	4.9	5.2	-	-	-
7	41.25	-	-	-	4.0	4.6	5.0	-	-	-
7	45.38	-	-	-	-	4.3	4.7	-	-	-
7	49.50	-	-	-	-	4.4	4.4	-	-	-
7	53.63	-	-	-	-	4.1	4.1	-	-	-
8	0.00	9.6	9.1	8.9	8.8	8.8	8.7	8.7	-	-
8	4.13	7.6	7.6	7.6	7.6	7.6	7.6	7.6	-	-
8	8.25	7.0	7.2	7.2	7.3	7.3	7.3	7.3	-	-
8	12.38	6.4	6.7	6.9	7.0	7.1	7.2	7.2	-	-
8	16.50	5.7	6.2	6.6	6.8	6.9	7.0	7.1	-	-
8	20.63	5.0	5.7	6.2	6.5	6.7	6.8	6.9	-	-
8	24.75	4.1	5.2	5.8	6.2	6.4	6.6	6.8	-	-
8	28.88	-	4.5	5.3	5.8	6.2	6.4	6.6	-	-
8	33.00	-	-	4.8	5.4	5.9	6.2	6.4	-	-
8	37.13	-	-	4.3	5.0	5.6	5.9	6.2	-	-
8	41.25	-	-	-	4.6	5.2	5.6	6.0	-	-
8	45.38	-	-	-	4.1	4.8	5.4	5.7	-	-

TABLE 3 (continued)

DBH	HEIGHT ABOVE STUMP	TOTAL HEIGHT OF TREE IN FEET								
		40	50	60	70	80	90	100	110	120
8	49.50	-	-	-	-	4.4	5.0	5.5	-	-
8	53.63	-	-	-	-	4.0	4.7	5.2	-	-
8	57.75	-	-	-	-	-	4.3	4.9	-	-
8	61.88	-	-	-	-	-	-	4.6	-	-
8	66.00	-	-	-	-	-	-	4.2	-	-
9	0.00	10.9	10.4	10.1	10.0	9.9	9.8	9.8	9.8	-
9	4.13	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	-
9	8.25	7.8	8.0	8.1	8.2	8.2	8.2	8.2	8.2	-
9	12.38	7.1	7.5	7.8	7.9	8.0	8.0	8.0	8.0	-
9	16.50	6.4	7.0	7.4	7.6	7.7	7.8	7.9	.79	-
9	20.63	5.5	6.4	6.9	7.3	7.5	7.6	7.8	7.8	-
9	24.75	4.6	5.7	6.4	6.9	7.2	7.4	7.6	7.7	-
9	28.88	-	5.1	5.9	6.5	6.9	7.2	7.4	7.5	-
9	33.00	-	4.3	5.4	6.1	6.6	6.9	7.2	7.4	-
9	37.13	-	-	4.8	5.6	6.2	6.6	6.9	7.2	-
9	41.25	-	-	4.1	5.1	5.8	6.3	6.7	7.0	-
9	45.38	-	-	-	4.6	5.4	6.0	6.4	6.8	-
9	49.50	-	-	-	4.0	4.9	5.6	6.1	6.5	-
9	53.63	-	-	-	-	4.5	5.2	5.8	6.2	-
9	57.75	-	-	-	-	-	4.8	5.5	6.0	-
9	61.88	-	-	-	-	-	4.4	5.1	5.7	-
9	66.00	-	-	-	-	-	-	4.7	5.3	-
9	70.13	-	-	-	-	-	-	4.3	5.0	-
9	74.25	-	-	-	-	-	-	-	4.6	-
9	78.38	-	-	-	-	-	-	-	4.3	-
10	0.00	12.2	11.6	11.3	11.1	11.0	11.0	10.9	10.9	-
10	4.13	9.4	9.5	9.5	9.5	9.5	9.5	9.5	9.4	-
10	8.25	8.7	8.9	9.0	9.0	9.1	9.1	9.1	9.0	-
10	12.38	7.9	8.3	8.6	8.7	8.8	8.9	8.9	8.9	-
10	16.50	7.0	7.7	8.1	8.4	8.6	8.7	8.7	8.8	-
10	20.63	6.1	7.0	7.6	8.0	8.3	8.5	8.6	8.6	-
10	24.75	5.1	6.3	7.1	7.6	8.0	8.2	8.4	8.5	-
10	28.88	4.0	5.6	6.5	7.2	7.6	7.9	8.2	8.3	-
10	33.00	-	4.7	5.9	6.7	7.2	7.6	7.9	8.1	-
10	37.13	-	-	5.2	6.2	6.8	7.3	7.7	7.9	-
10	41.25	-	-	4.5	5.6	6.4	7.0	7.4	7.7	-
10	45.38	-	-	-	5.0	5.9	6.6	7.1	7.4	-
10	49.50	-	-	-	4.4	5.4	6.2	6.8	7.2	-
10	53.63	-	-	-	-	4.9	5.8	6.4	6.9	-
10	57.75	-	-	-	-	4.3	5.3	6.0	6.6	-

TABLE 3 (continued)

DBH	HEIGHT ABOVE STUMP	TOTAL HEIGHT OF TREE IN FEET								
		40	50	60	70	80	90	100	110	120
10	61.88	-	-	-	-	-	4.8	5.6	6.2	-
10	66.00	-	-	-	-	-	4.3	5.2	5.9	-
10	70.13	-	-	-	-	-	-	4.7	5.5	-
10	74.25	-	-	-	-	-	-	4.3	5.1	-
10	78.38	-	-	-	-	-	-	-	4.7	-
10	82.50	-	-	-	-	-	-	-	4.2	-
11	0.00	-	12.8	12.4	12.3	12.2	12.1	12.1	12.1	-
11	4.13	-	10.4	10.4	10.4	10.4	10.4	10.4	10.4	-
11	8.25	-	9.7	9.9	9.9	10.0	10.0	9.9	9.9	-
11	12.38	-	9.1	9.4	9.6	9.7	9.7	9.7	9.7	-
11	16.50	-	8.4	8.9	9.2	9.4	9.5	9.6	9.6	-
11	20.63	-	7.7	8.3	8.8	9.1	9.2	9.4	9.5	-
11	24.75	-	6.9	7.8	8.3	8.7	9.0	9.2	9.3	-
11	28.88	-	6.1	7.1	7.8	8.3	8.7	8.9	9.1	-
11	33.00	-	5.2	6.4	7.3	7.9	8.3	8.7	8.9	-
11	37.13	-	4.2	5.7	6.7	7.5	8.0	8.4	8.7	-
11	41.25	-	-	4.9	6.1	7.0	7.6	8.1	8.4	-
11	45.38	-	-	4.1	5.5	6.5	7.2	7.7	8.1	-
11	49.50	-	-	-	4.8	5.9	6.8	7.4	7.8	-
11	53.63	-	-	-	4.0	5.3	6.3	7.0	7.5	-
11	57.75	-	-	-	-	4.7	5.8	6.6	7.2	-
11	61.88	-	-	-	-	4.0	5.2	6.1	6.8	-
11	66.00	-	-	-	-	-	4.7	5.7	6.4	-
11	70.13	-	-	-	-	-	4.1	5.2	6.0	-
11	74.25	-	-	-	-	-	-	4.6	5.6	-
11	78.38	-	-	-	-	-	-	4.1	5.1	-
11	82.50	-	-	-	-	-	-	-	4.6	-
11	86.63	-	-	-	-	-	-	-	4.1	-
12	0.00	-	14.0	13.6	13.4	13.3	13.2	13.2	13.2	-
12	4.13	-	11.3	11.3	11.3	11.3	11.3	11.3	11.3	-
12	8.25	-	10.6	10.7	10.8	10.8	10.8	10.8	10.8	-
12	12.38	-	9.9	10.2	10.4	10.5	10.6	10.6	10.6	-
12	16.50	-	9.1	9.6	10.0	10.2	10.3	10.4	10.4	-
12	20.63	-	8.3	9.0	9.5	9.8	10.0	10.2	10.3	-
12	24.75	-	7.4	8.4	9.0	9.4	9.7	9.9	10.1	-
12	28.88	-	6.6	7.7	8.5	9.0	9.4	9.7	9.9	-
12	33.00	-	5.6	7.0	7.9	8.6	9.0	9.4	9.6	-
12	37.13	-	4.5	6.2	7.3	8.1	8.7	9.1	9.4	-
12	41.25	-	-	5.3	6.6	7.6	8.2	8.7	9.1	-
12	45.38	-	-	4.4	5.9	7.0	7.8	8.4	8.8	-
12	49.50	-	-	-	5.2	6.4	7.3	8.0	8.5	-

TABLE 3 (continued)

DBH	HEIGHT ABOVE STUMP	TOTAL HEIGHT OF TREE IN FEET								
		40	50	60	70	80	90	100	110	120
12	53.63	-	-	-	4.4	5.8	6.8	7.6	8.1	-
12	57.75	-	-	-	-	5.1	6.2	7.1	7.8	-
12	61.88	-	-	-	-	4.4	5.7	6.6	7.4	-
12	66.00	-	-	-	-	-	5.0	6.1	7.0	-
12	70.13	-	-	-	-	-	4.4	5.6	6.5	-
12	74.25	-	-	-	-	-	-	5.0	6.0	-
12	78.38	-	-	-	-	-	-	4.4	5.5	-
12	82.50	-	-	-	-	-	-	-	5.0	-
12	86.63	-	-	-	-	-	-	-	4.4	-
13	0.00	-	15.3	14.8	14.6	14.4	14.4	14.3	14.3	14.3
13	4.13	-	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2
13	8.25	-	11.4	11.6	11.6	11.7	11.7	11.7	11.6	11.6
13	12.38	-	10.7	11.0	11.2	11.3	11.4	11.4	11.4	11.4
13	16.50	-	9.8	10.4	10.7	11.0	11.1	11.2	11.2	11.2
13	20.63	-	9.0	9.7	10.2	10.6	10.8	11.0	11.0	11.1
13	24.75	-	8.0	9.0	9.7	10.2	10.5	10.7	10.9	10.9
13	28.88	-	7.0	8.3	9.1	9.7	10.1	10.4	10.6	10.8
13	33.00	-	6.0	7.5	8.5	9.2	9.7	10.1	10.4	10.6
13	37.13	-	4.8	6.6	7.8	8.7	9.3	9.8	10.1	10.4
13	41.25	-	-	5.7	7.1	8.1	8.8	9.4	9.8	10.1
13	45.38	-	-	4.7	6.4	7.5	8.4	9.0	9.5	9.8
13	49.50	-	-	-	5.6	6.9	7.8	8.6	9.1	9.6
13	53.63	-	-	-	4.7	6.2	7.3	8.1	8.8	9.2
13	57.75	-	-	-	-	5.5	6.7	7.6	8.3	8.9
13	61.88	-	-	-	-	4.7	6.1	7.1	7.9	8.6
13	66.00	-	-	-	-	-	5.4	6.6	7.5	8.2
13	70.13	-	-	-	-	-	4.7	6.0	7.0	7.8
13	74.25	-	-	-	-	-	-	5.4	6.5	7.3
13	78.38	-	-	-	-	-	-	4.7	5.9	6.9
13	82.50	-	-	-	-	-	-	4.0	5.4	6.4
13	86.63	-	-	-	-	-	-	-	4.8	5.9
13	90.75	-	-	-	-	-	-	-	4.1	5.4
13	94.88	-	-	-	-	-	-	-	-	4.8
13	99.00	-	-	-	-	-	-	-	-	4.2
14	0.00	-	16.5	16.0	15.8	15.6	15.5	15.5	15.4	15.4
14	4.13	-	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.1
14	8.25	-	12.3	12.4	12.5	12.5	12.5	12.5	12.5	12.4
14	12.38	-	11.4	11.8	12.0	12.2	12.2	12.2	12.2	12.2
14	16.50	-	10.5	11.1	11.5	11.8	11.9	12.0	12.0	12.0
14	20.63	-	9.6	10.4	11.0	11.3	11.6	11.7	11.8	11.9
14	24.75	-	8.6	9.7	10.4	10.9	11.2	11.5	11.6	11.7

TABLE 3 (continued)

DBH	HEIGHT ABOVE STUMP	TOTAL HEIGHT OF TREE IN FEET								
		40	50	60	70	80	90	100	110	120
14	28.88	-	7.5	8.9	9.8	10.4	10.8	11.2	11.4	11.5
14	33.00	-	6.3	8.0	9.1	9.8	10.4	10.8	11.1	11.3
14	37.13	-	5.1	7.1	8.4	9.3	10.0	10.4	10.8	11.1
14	41.25	-	-	6.1	7.6	8.7	9.5	10.0	10.5	10.8
14	45.38	-	-	5.0	6.8	8.0	8.9	9.6	10.1	10.5
14	49.50	-	-	-	5.9	7.3	8.4	9.2	9.8	10.2
14	53.63	-	-	-	5.0	6.6	7.8	8.7	9.4	9.9
14	57.75	-	-	-	4.0	5.8	7.2	8.2	8.9	9.5
14	61.88	-	-	-	-	5.0	6.5	7.6	8.5	9.1
14	66.00	-	-	-	-	4.1	5.8	7.0	8.0	8.7
14	70.13	-	-	-	-	-	5.0	6.4	7.5	8.3
14	74.25	-	-	-	-	-	4.2	5.7	6.9	7.8
14	78.38	-	-	-	-	-	-	5.0	6.3	7.4
14	82.50	-	-	-	-	-	-	4.3	5.7	6.8
14	86.63	-	-	-	-	-	-	-	5.1	6.3
14	90.75	-	-	-	-	-	-	-	4.4	5.7
14	94.88	-	-	-	-	-	-	-	-	5.1
14	99.00	-	-	-	-	-	-	-	-	4.5
15	0.00	-	17.7	17.2	16.9	16.8	16.7	16.6	16.6	16.6
15	4.13	-	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1
15	8.25	-	13.1	13.3	13.4	13.4	13.4	13.4	13.3	13.3
15	12.38	-	12.2	12.6	12.8	13.0	13.0	13.0	13.0	13.0
15	16.50	-	11.2	11.9	12.3	12.5	12.7	12.8	12.8	12.8
15	20.63	-	10.2	11.1	11.7	12.1	12.3	12.5	12.6	12.7
15	24.75	-	9.1	10.3	11.0	11.6	12.0	12.2	12.4	12.5
15	28.88	-	8.0	9.4	10.4	11.0	11.5	11.9	12.1	12.3
15	33.00	-	6.7	8.5	9.7	10.5	11.1	11.5	11.8	12.0
15	37.13	-	5.4	7.5	8.9	9.9	10.6	11.1	11.5	11.8
15	41.25	-	-	6.4	8.1	9.2	10.1	10.7	11.2	11.5
15	45.38	-	-	5.3	7.2	8.5	9.5	10.2	10.8	11.2
15	49.50	-	-	4.1	6.3	7.8	8.9	9.7	10.4	10.9
15	53.63	-	-	-	5.3	7.0	8.3	9.2	9.9	10.5
15	57.75	-	-	-	4.2	6.2	7.6	8.7	9.5	10.1
15	61.88	-	-	-	-	5.3	6.9	8.1	9.0	9.7
15	66.00	-	-	-	-	4.3	6.1	7.4	8.5	9.3
15	70.13	-	-	-	-	-	5.3	6.8	7.9	8.8
15	74.25	-	-	-	-	-	4.4	6.1	7.3	8.3
15	78.38	-	-	-	-	-	-	5.3	6.7	7.8
15	82.50	-	-	-	-	-	-	4.5	6.1	7.3
15	86.63	-	-	-	-	-	-	-	5.4	6.7
15	90.75	-	-	-	-	-	-	-	4.6	6.1

TABLE 3 (continued)

DBH	HEIGHT ABOVE STUMP	TOTAL HEIGHT OF TREE IN FEET								
		40	50	60	70	80	90	100	110	120
15	94.88	-	-	-	-	-	-	-	-	5.4
15	99.00	-	-	-	-	-	-	-	-	4.7
15	103.13	-	-	-	-	-	-	-	-	4.0
16	0.00	-	-	18.4	18.1	17.9	17.8	17.7	17.7	17.7
16	4.13	-	-	15.0	15.0	15.0	15.0	15.0	15.0	15.0
16	8.25	-	-	14.1	14.2	14.2	14.2	14.2	14.2	14.1
16	12.38	-	-	13.4	13.6	13.8	13.8	13.9	13.8	13.8
16	16.50	-	-	12.6	13.0	13.3	13.5	13.6	13.6	13.6
16	20.63	-	-	11.7	12.4	12.8	13.1	13.3	13.4	13.4
16	24.75	-	-	10.9	11.7	12.3	12.7	12.9	13.1	13.2
16	28.88	-	-	10.0	11.0	11.7	12.2	12.6	12.8	13.0
16	33.00	-	-	9.0	10.2	11.1	11.7	12.2	12.5	12.8
16	37.13	-	-	7.9	9.4	10.4	11.2	11.8	12.2	12.5
16	41.25	-	-	6.8	8.5	9.8	10.6	11.3	11.8	12.2
16	45.38	-	-	5.6	7.6	9.0	10.0	10.8	11.4	11.9
16	49.50	-	-	4.3	6.6	8.2	9.4	10.3	11.0	11.5
16	53.63	-	-	-	5.6	7.4	8.7	9.7	10.5	11.1
16	57.75	-	-	-	4.4	6.5	8.0	9.2	10.0	10.7
16	61.88	-	-	-	-	5.6	7.3	8.5	9.5	10.3
16	66.00	-	-	-	-	4.6	6.5	7.9	9.0	9.8
16	70.13	-	-	-	-	-	5.6	7.2	8.4	9.3
16	74.25	-	-	-	-	-	4.7	6.4	7.8	8.8
16	78.38	-	-	-	-	-	-	5.6	7.1	8.3
16	82.50	-	-	-	-	-	-	4.8	6.4	7.7
16	86.63	-	-	-	-	-	-	-	5.7	7.1
16	90.75	-	-	-	-	-	-	-	4.9	6.4
16	94.88	-	-	-	-	-	-	-	4.1	5.7
16	99.00	-	-	-	-	-	-	-	-	5.0
16	103.13	-	-	-	-	-	-	-	-	4.2
17	0.00	-	-	19.6	19.3	19.1	18.9	18.9	18.8	18.8
17	4.13	-	-	15.9	15.9	15.9	15.9	15.9	15.9	15.9
17	8.25	-	-	14.9	15.0	15.1	15.1	15.0	15.0	14.9
17	12.38	-	-	14.1	14.4	14.6	14.6	14.7	14.6	14.6
17	16.50	-	-	13.3	13.8	14.1	14.2	14.3	14.4	14.4
17	20.63	-	-	12.4	13.1	13.5	13.8	14.0	14.1	14.2
17	24.75	-	-	11.5	12.3	13.0	13.4	13.7	13.9	14.0
17	28.88	-	-	10.5	11.6	12.3	12.9	13.3	13.6	13.7
17	33.00	-	-	9.4	10.8	11.7	12.4	12.9	13.2	13.5
17	37.13	-	-	8.3	9.9	11.0	11.8	12.4	12.8	13.2
17	41.25	-	-	7.1	9.0	10.3	11.2	11.9	12.5	12.9
17	45.38	-	-	5.9	8.0	9.5	10.6	11.4	12.0	12.5

TABLE 3 (continued)

DBH	HEIGHT ABOVE STUMP	TOTAL HEIGHT OF TREE IN FEET								
		40	50	60	70	80	90	100	110	120
17	49.50	-	-	4.5	7.0	8.7	9.9	10.8	11.6	12.1
17	53.63	-	-	-	5.8	7.8	9.2	10.3	11.1	11.7
17	57.75	-	-	-	4.6	6.9	8.4	9.6	10.6	11.3
17	61.88	-	-	-	-	5.9	7.6	9.0	10.0	10.8
17	66.00	-	-	-	-	4.8	6.8	8.3	9.4	10.3
17	70.13	-	-	-	-	-	5.9	7.6	8.8	9.8
17	74.25	-	-	-	-	-	4.9	6.8	8.2	9.3
17	78.38	-	-	-	-	-	-	5.9	7.5	8.7
17	82.50	-	-	-	-	-	-	5.0	6.8	8.1
17	86.63	-	-	-	-	-	-	4.1	6.0	7.4
17	90.75	-	-	-	-	-	-	-	5.2	6.8
17	94.88	-	-	-	-	-	-	-	4.3	6.0
17	99.00	-	-	-	-	-	-	-	-	5.3
17	103.13	-	-	-	-	-	-	-	-	4.4
18	0.00	-	-	20.8	20.4	20.2	20.1	20.0	20.0	19.9
18	4.13	-	-	16.8	16.8	16.8	16.8	16.8	16.8	16.8
18	8.25	-	-	15.7	15.9	15.9	15.9	15.9	15.8	15.7
18	12.38	-	-	14.9	15.2	15.3	15.4	15.5	15.4	15.4
18	16.50	-	-	14.0	14.5	14.8	15.0	15.1	15.1	15.1
18	20.63	-	-	13.0	13.8	14.2	14.6	14.8	14.9	14.9
18	24.75	-	-	12.0	13.0	13.6	14.1	14.4	14.6	14.7
18	28.88	-	-	11.0	12.2	13.0	13.6	14.0	14.3	14.4
18	33.00	-	-	9.9	11.3	12.3	13.0	13.5	13.9	14.2
18	37.13	-	-	8.7	10.4	11.6	12.4	13.0	13.5	13.8
18	41.25	-	-	7.5	9.4	10.8	11.8	12.5	13.1	13.5
18	45.38	-	-	6.1	8.4	10.0	11.1	12.0	12.6	13.1
18	49.50	-	-	4.7	7.3	9.1	10.4	11.4	12.2	12.7
18	53.63	-	-	-	6.1	8.2	9.6	10.8	11.6	12.3
18	57.75	-	-	-	4.8	7.2	8.9	10.1	11.1	11.8
18	61.88	-	-	-	-	6.1	8.0	9.4	10.5	11.4
18	66.00	-	-	-	-	5.0	7.1	8.7	9.9	10.8
18	70.13	-	-	-	-	-	6.2	7.9	9.2	10.3
18	74.25	-	-	-	-	-	5.1	7.1	8.6	9.7
18	78.38	-	-	-	-	-	4.0	6.2	7.8	9.1
18	82.50	-	-	-	-	-	-	5.3	7.1	8.5
18	86.63	-	-	-	-	-	-	4.2	6.3	7.8
18	90.75	-	-	-	-	-	-	-	5.4	7.1
18	94.88	-	-	-	-	-	-	-	-	6.3
18	99.00	-	-	-	-	-	-	-	-	5.5
18	103.13	-	-	-	-	-	-	-	-	4.6

TABLE 3 (continued)

DBH	HEIGHT ABOVE STUMP	TOTAL HEIGHT OF TREE IN FEET								
		40	50	60	70	80	90	100	110	120
19	0.00	-	-	22.0	21.6	21.4	21.2	21.1	21.1	21.1
19	4.13	-	-	17.7	17.7	17.7	17.7	17.7	17.7	17.7
19	8.25	-	-	16.6	16.7	16.7	16.7	16.7	16.6	16.6
19	12.38	-	-	15.6	15.9	16.1	16.2	16.2	16.2	16.1
19	16.50	-	-	14.7	15.2	15.5	15.8	15.9	15.9	15.9
19	20.63	-	-	13.7	14.4	14.9	15.3	15.5	15.6	15.7
19	24.75	-	-	12.6	13.6	14.3	14.8	15.1	15.3	15.4
19	28.88	-	-	11.5	12.7	13.6	14.2	14.6	14.9	15.1
19	33.00	-	-	10.3	11.8	12.9	13.6	14.2	14.6	14.8
19	37.13	-	-	9.1	10.9	12.1	13.0	13.7	14.2	14.5
19	41.25	-	-	7.8	9.8	11.3	12.3	13.1	13.7	14.2
19	45.38	-	-	6.4	8.8	10.4	11.6	12.5	13.2	13.8
19	49.50	-	-	4.9	7.6	9.5	10.9	11.9	12.7	13.3
19	53.63	-	-	-	6.4	8.5	10.1	11.3	12.2	12.9
19	57.75	-	-	-	5.0	7.5	9.3	10.6	11.6	12.4
19	61.88	-	-	-	-	6.4	8.4	9.8	11.0	11.9
19	66.00	-	-	-	-	5.2	7.4	9.1	10.4	11.4
19	70.13	-	-	-	-	-	6.4	8.3	9.7	10.8
19	74.25	-	-	-	-	-	5.4	7.4	9.0	10.2
19	78.38	-	-	-	-	-	4.2	6.5	8.2	9.5
19	82.50	-	-	-	-	-	-	5.5	7.4	8.9
19	86.63	-	-	-	-	-	-	4.4	6.5	8.2
19	90.75	-	-	-	-	-	-	-	5.6	7.4
19	94.88	-	-	-	-	-	-	-	4.7	6.6
19	99.00	-	-	-	-	-	-	-	-	5.8
19	103.10	-	-	-	-	-	-	-	-	4.8
20	0.00	-	-	23.2	22.8	22.5	22.4	22.2	22.2	22.2
20	4.13	-	-	18.6	18.6	18.6	18.6	18.6	18.6	18.6
20	8.25	-	-	17.4	17.5	17.5	17.5	17.5	17.4	17.4
20	12.38	-	-	16.4	16.7	16.9	17.0	17.0	17.0	16.9
20	16.50	-	-	15.3	15.9	16.3	16.5	16.6	16.6	16.6
20	20.63	-	-	14.3	15.1	15.6	16.0	16.2	16.3	16.4
20	24.75	-	-	13.2	14.2	14.9	15.4	15.8	16.0	16.1
20	28.88	-	-	12.0	13.3	14.2	14.8	15.3	15.6	15.8
20	33.00	-	-	10.8	12.3	13.4	14.2	14.8	15.2	15.5
20	37.13	-	-	9.5	11.3	12.6	13.6	14.3	14.8	15.2
20	41.25	-	-	8.1	10.3	11.8	12.9	13.7	14.3	14.8
20	45.38	-	-	6.6	9.1	10.9	12.1	13.1	13.8	14.4
20	49.50	-	-	5.0	7.9	9.9	11.3	12.4	13.3	13.9

TABLE 3 (continued)

DBH	HEIGHT ABOVE STUMP	TOTAL HEIGHT OF TREE IN FEET								
		40	50	60	70	80	90	100	110	120
20	53.63	-	-	-	6.6	8.9	10.5	11.8	12.7	13.4
20	57.75	-	-	-	5.2	7.8	9.6	11.0	12.1	12.9
20	61.88	-	-	-	-	6.6	8.7	10.3	11.5	12.4
20	66.00	-	-	-	-	5.4	7.7	9.5	10.8	11.8
20	70.13	-	-	-	-	4.0	6.7	8.6	10.1	11.2
20	74.25	-	-	-	-	-	5.6	7.7	9.3	10.6
20	78.38	-	-	-	-	-	4.3	6.8	8.5	9.9
20	82.50	-	-	-	-	-	-	5.7	7.7	9.2
20	86.63	-	-	-	-	-	-	4.6	6.8	8.5
20	90.75	-	-	-	-	-	-	-	5.9	7.7
20	94.88	-	-	-	-	-	-	-	4.8	6.9
20	99.00	-	-	-	-	-	-	-	-	6.0
20	103.13	-	-	-	-	-	-	-	-	5.0
20	107.25	-	-	-	-	-	-	-	-	4.0
21	0.00	-	-	-	24.0	23.7	23.5	23.4	23.4	23.3
21	4.13	-	-	-	19.5	19.5	19.5	19.5	19.5	19.5
21	8.25	-	-	-	18.3	18.4	18.4	18.3	18.2	18.1
21	12.38	-	-	-	17.5	17.7	17.8	17.8	17.7	17.6
21	16.50	-	-	-	16.6	17.0	17.2	17.3	17.4	17.4
21	20.63	-	-	-	15.7	16.3	16.7	16.9	17.0	17.1
21	24.75	-	-	-	14.8	15.6	16.1	16.5	16.7	16.8
21	28.88	-	-	-	13.8	14.8	15.5	16.0	16.3	16.5
21	33.00	-	-	-	12.8	14.0	14.8	15.4	15.9	16.2
21	37.13	-	-	-	11.8	13.1	14.1	14.9	15.4	15.8
21	41.25	-	-	-	10.7	12.2	13.4	14.3	14.9	15.4
21	45.38	-	-	-	9.5	11.3	12.6	13.6	14.4	15.0
21	49.50	-	-	-	8.2	10.3	11.8	12.9	13.8	14.5
21	53.63	-	-	-	6.9	9.2	10.9	12.2	13.2	14.0
21	57.75	-	-	-	5.4	8.1	10.0	11.5	12.6	13.5
21	61.88	-	-	-	-	6.9	9.1	10.7	11.9	12.9
21	66.00	-	-	-	-	5.6	8.0	9.8	11.2	12.3
21	70.13	-	-	-	-	4.2	7.0	9.0	10.5	11.7
21	74.25	-	-	-	-	-	5.8	8.0	9.7	11.0
21	78.38	-	-	-	-	-	4.5	7.0	8.9	10.3
21	82.50	-	-	-	-	-	-	5.9	8.0	9.6
21	86.63	-	-	-	-	-	-	4.8	7.1	8.8
21	90.75	-	-	-	-	-	-	-	6.1	8.0
21	94.88	-	-	-	-	-	-	-	5.0	7.1
21	99.00	-	-	-	-	-	-	-	-	6.2
21	103.13	-	-	-	-	-	-	-	-	5.2
21	107.25	-	-	-	-	-	-	-	-	4.2

TABLE 3 (continued)

DBH	HEIGHT ABOVE STUMP	TOTAL HEIGHT OF TREE IN FEET								
		40	50	60	70	80	90	100	110	120
22	0.00	-	-	-	25.1	24.8	24.7	24.6	24.5	24.5
22	4.13	-	-	-	20.4	20.4	20.4	20.4	20.4	20.3
22	8.25	-	-	-	19.1	19.2	19.2	19.1	19.0	18.9
22	12.38	-	-	-	18.2	18.4	18.5	18.5	18.5	18.4
22	16.50	-	-	-	17.3	17.7	17.9	18.1	18.1	18.1
22	20.63	-	-	-	16.4	17.0	17.4	17.6	17.8	17.8
22	24.75	-	-	-	15.4	16.2	16.8	17.1	17.4	17.5
22	28.88	-	-	-	14.4	15.4	16.1	16.6	17.0	17.2
22	33.00	-	-	-	13.3	14.5	15.4	16.0	16.5	16.8
22	37.13	-	-	-	12.2	13.6	14.7	15.4	16.0	16.4
22	41.25	-	-	-	11.0	12.7	13.9	14.8	15.5	16.0
22	45.38	-	-	-	9.8	11.7	13.1	14.1	14.9	15.6
22	49.50	-	-	-	8.5	10.7	12.2	13.4	14.4	15.1
22	53.63	-	-	-	7.1	9.6	11.3	12.7	13.7	14.5
22	57.75	-	-	-	5.6	8.4	10.4	11.9	13.1	14.0
22	61.88	-	-	-	-	7.1	9.4	11.1	12.4	13.4
22	66.00	-	-	-	-	5.8	8.3	10.2	11.6	12.8
22	70.13	-	-	-	-	4.3	7.2	9.3	10.9	12.1
22	74.25	-	-	-	-	-	6.0	8.3	10.1	11.4
22	78.38	-	-	-	-	-	4.6	7.3	9.2	10.7
22	82.50	-	-	-	-	-	-	6.1	8.3	10.0
22	86.63	-	-	-	-	-	-	4.9	7.3	9.2
22	90.75	-	-	-	-	-	-	-	6.3	8.3
22	94.88	-	-	-	-	-	-	-	5.2	7.4
22	99.00	-	-	-	-	-	-	-	4.0	6.4
22	103.13	-	-	-	-	-	-	-	-	5.4
22	107.25	-	-	-	-	-	-	-	-	4.3
23	0.00	-	-	-	26.3	26.0	25.8	25.7	25.6	25.6
23	4.13	-	-	-	21.3	21.3	21.3	21.3	21.2	21.2
23	8.25	-	-	-	19.9	20.0	20.0	19.9	19.8	19.7
23	12.38	-	-	-	18.9	19.2	19.3	19.3	19.2	19.1
23	16.50	-	-	-	18.0	18.4	18.7	18.8	18.8	18.8
23	20.63	-	-	-	17.0	17.6	18.0	18.3	18.4	18.5
23	24.75	-	-	-	16.0	16.8	17.4	17.8	18.0	18.2
23	28.88	-	-	-	14.9	16.0	16.7	17.2	17.6	17.8
23	33.00	-	-	-	13.8	15.1	16.0	16.6	17.1	17.5
23	37.13	-	-	-	12.6	14.1	15.2	16.0	16.6	17.0
23	41.25	-	-	-	11.4	13.1	14.4	15.4	16.1	16.6
23	45.38	-	-	-	10.1	12.1	13.6	14.7	15.5	16.1
23	49.50	-	-	-	8.8	11.0	12.7	13.9	14.9	15.6
23	53.63	-	-	-	7.3	9.9	11.7	13.1	14.2	15.1
23	57.75	-	-	-	5.8	8.7	10.7	12.3	13.5	14.5

TABLE 3 (continued)

DBH	HEIGHT ABOVE STUMP	TOTAL HEIGHT OF TREE IN FEET								
		40	50	60	70	80	90	100	110	120
23	61.88	-	-	-	4.0	7.4	9.7	11.5	12.8	13.9
23	66.00	-	-	-	-	6.0	8.6	10.6	12.1	13.2
23	70.13	-	-	-	-	4.4	7.4	9.6	11.2	12.6
23	74.25	-	-	-	-	-	6.2	8.6	10.4	11.8
23	78.38	-	-	-	-	-	4.8	7.5	9.5	11.1
23	82.50	-	-	-	-	-	-	6.3	8.6	10.3
23	86.63	-	-	-	-	-	-	5.1	7.6	9.5
23	90.75	-	-	-	-	-	-	-	6.5	8.6
23	94.88	-	-	-	-	-	-	-	5.4	7.7
23	99.00	-	-	-	-	-	-	-	4.1	6.7
23	103.13	-	-	-	-	-	-	-	-	5.6
23	107.25	-	-	-	-	-	-	-	-	4.5
24	0.00	-	-	-	27.5	27.2	27.0	26.8	26.8	26.7
24	4.13	-	-	-	22.2	22.2	22.2	22.2	22.1	22.1
24	8.25	-	-	-	20.7	20.7	20.7	20.7	20.6	20.5
24	12.38	-	-	-	19.7	19.9	20.0	20.0	20.0	19.9
24	16.50	-	-	-	18.7	19.1	19.4	19.5	19.5	19.5
24	20.63	-	-	-	17.6	18.3	18.7	19.0	19.1	19.2
24	24.75	-	-	-	16.6	17.4	18.0	18.4	18.7	18.8
24	28.88	-	-	-	15.4	16.5	17.3	17.9	18.2	18.5
24	33.00	-	-	-	14.3	15.6	26.5	17.2	17.7	18.1
24	37.13	-	-	-	13.1	14.6	15.7	16.6	17.2	17.6
24	41.25	-	-	-	11.8	13.6	14.9	15.9	16.6	17.2
24	45.38	-	-	-	10.5	12.5	14.0	15.2	16.0	16.7
24	49.50	-	-	-	9.0	11.4	13.1	14.4	15.4	16.2
24	53.63	-	-	-	7.6	10.2	12.1	13.6	14.7	15.6
24	57.75	-	-	-	5.9	8.9	11.1	12.7	14.0	15.0
24	61.88	-	-	-	4.1	7.6	10.0	11.8	13.2	14.4
24	66.00	-	-	-	-	6.2	8.9	10.9	12.4	13.7
24	70.13	-	-	-	-	4.6	7.7	9.9	11.6	13.0
24	74.25	-	-	-	-	-	6.4	8.8	10.7	12.2
24	78.38	-	-	-	-	-	4.9	7.7	9.8	11.5
24	82.50	-	-	-	-	-	-	6.5	8.8	10.6
24	86.63	-	-	-	-	-	-	5.2	7.8	9.8
24	90.75	-	-	-	-	-	-	-	6.7	8.9
24	94.88	-	-	-	-	-	-	-	5.5	7.9
24	99.00	-	-	-	-	-	-	-	4.2	6.9
24	103.13	-	-	-	-	-	-	-	-	5.8
24	107.25	-	-	-	-	-	-	-	-	4.6

TABLE 4.--ESTIMATED TREE VOLUMES IN BOARD FEET SCRIBNER (SV), BY FORMULA RULE. BASED ON 16-FOOT SCALING LENGTH (EXCEPT TOP LOGS) AND ESTIMATED LOG TOP DIAMETERS INSIDE BARK (CORRESPONDING TO MEASUREMENT OF SCALING DIAMETERS TO "NEAREST INCH"). 6-INCH TRIM ALLOWANCE PER 16-FOOT LOG. VALUES OMITTED FOR TREES HAVING LESS THAN 8 FEET OF MERCHANTABLE BOLE.

DBH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT- INCHES IB				DBH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT- INCHES IB			
		12.0 SV12	10.0 SV10	8.0 SV8	6.0 SV6			12.0 SV12	10.0 SV10	8.0 SV8	6.0 SV6
8	40	-	-	-	11	12	80	-	65	103	112
8	50	-	-	-	16	12	90	-	75	121	133
8	60	-	-	-	21	12	100	-	85	137	152
8	70	-	-	-	26	12	110	-	94	158	174
8	80	-	-	-	31						
8	90	-	-	-	37	13	50	-	52	68	65
8	100	-	-	-	43	13	60	-	69	86	91
						13	70	-	86	108	113
9	40	-	-	-	17	13	80	-	102	131	138
9	50	-	-	16	26	13	90	-	119	151	161
9	60	-	-	18	33	13	100	-	134	176	186
9	70	-	-	20	40	13	110	-	152	199	211
9	80	-	-	22	50	13	120	-	170	221	236
9	90	-	-	24	58						
9	100	-	-	25	66	14	50	50	70	82	78
9	110	-	-	25	76	14	60	57	93	102	109
						14	70	65	114	132	133
10	40	-	-	22	24	14	80	73	133	158	164
10	50	-	-	27	35	14	90	80	157	185	191
10	60	-	-	34	44	14	100	85	181	214	222
10	70	-	-	43	57	14	110	90	204	240	250
10	80	-	-	51	69	14	120	90	228	270	282
10	90	-	-	59	80						
10	100	-	-	67	94	15	50	68	89	95	93
10	110	-	-	76	105	15	60	82	115	123	127
						15	70	100	139	157	156
11	50	-	-	40	45	15	80	120	168	185	192
11	60	-	-	53	59	15	90	138	198	220	223
11	70	-	-	65	75	15	100	156	225	252	260
11	80	-	-	76	88	15	110	173	256	286	292
11	90	-	-	90	106	15	120	191	286	320	330
11	100	-	-	104	122						
11	110	-	-	117	138	16	60	111	136	144	146
						16	70	137	166	181	181
12	50	-	39	54	55	16	80	162	203	216	221
12	60	-	46	70	74	16	90	186	236	256	259
12	70	-	54	84	93	16	100	213	270	292	300

TABLE 4 (continued)

DBH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT- INCHES IB				DBH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT- INCHES IB			
		12.0 SV12	10.0 SV10	8.0 SV8	6.0 SV6			12.0 SV12	10.0 SV10	8.0 SV8	6.0 SV6
16	110	242	308	333	338	20	100	428	460	474	473
16	120	269	341	370	379	20	110	486	521	533	539
						20	120	538	581	598	598
17	60	140	156	166	165	21	70	298	317	316	319
17	70	171	196	207	207	21	80	361	376	388	383
17	80	200	237	249	252	21	90	417	446	450	455
17	90	234	273	293	295	21	100	483	507	523	520
17	100	270	318	335	341	21	110	545	578	586	593
17	110	304	358	382	386	21	120	605	642	659	659
17	120	338	400	423	431						
18	60	166	176	188	186	22	70	333	347	347	349
18	70	201	226	233	234	22	80	400	415	424	419
18	80	239	271	282	283	22	90	463	490	494	498
18	90	283	316	331	334	22	100	537	558	572	569
18	100	323	365	380	384	22	110	603	636	643	648
18	110	363	409	431	435	22	120	675	703	721	721
18	120	408	460	480	485						
19	60	192	200	211	207	23	70	368	377	373	380
19	70	230	256	259	262	23	80	439	454	461	455
19	80	281	304	317	316	23	90	513	535	538	541
19	90	329	359	370	373	23	100	591	611	622	619
19	100	372	412	427	428	23	110	661	694	701	704
19	110	425	464	482	486	23	120	743	769	784	784
19	120	474	520	539	541						
20	60	216	226	234	228	24	70	402	408	410	411
20	70	263	286	286	290	24	80	477	494	499	492
20	80	322	338	352	349	24	90	562	579	584	585
20	90	373	402	409	413	24	100	645	665	673	670
						24	110	725	752	760	762
						24	120	811	836	848	848

TABLE 5.--ESTIMATED TREE VOLUMES IN BOARD FEET SCRIBNER (SV), BY FORMULA RULE. BASED ON 16-FOOT SCALING LENGTH (EXCEPT TOP LOGS), AND ESTIMATED LOG TOP DIAMETER INSIDE BARK MINUS 1/2 INCH (CORRESPONDING TO "ROUNDING DOWN" FRACTIONAL SCALING DIAMETERS TO NEXT LOWER EXACT INCH). 6-INCH TRIM ALLOWANCE PER 16-FOOT LOG. VALUES OMITTED FOR TREES HAVING LESS THAN 8 FEET OF MERCHANTABLE BOLE.

DBH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT- INCHES IB				DHH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT- INCHES IB			
		12.0 SV12	10.0 SV10	8.0 SV8	6.0 SV6			12.0 SV12	10.0 SV10	8.0 SV8	6.0 SV6
		-	-	-	8			-	47	72	79
8	40	-	-	-	8	12	70	-	47	72	79
8	50	-	-	-	12	12	80	-	57	89	95
8	60	-	-	-	16	12	90	-	66	105	113
8	70	-	-	-	20	12	100	-	75	119	130
8	80	-	-	-	24	12	110	-	83	137	149
8	90	-	-	-	28						
8	100	-	-	-	33	13	50	-	46	59	55
						13	60	-	61	75	78
9	40	-	-	-	12	13	70	-	76	94	97
9	50	-	-	13	20	13	80	-	90	114	119
9	60	-	-	15	26	13	90	-	104	132	140
9	70	-	-	17	31	13	100	-	119	154	161
9	80	-	-	18	39	13	110	-	135	174	183
9	90	-	-	20	46	13	120	-	151	194	205
9	100	-	-	21	53						
9	110	-	-	21	61	14	50	45	62	72	67
						14	60	52	83	89	94
10	40	-	-	18	19	14	70	59	101	116	116
10	50	-	-	22	28	14	80	66	119	139	143
10	60	-	-	28	35	14	90	72	141	163	167
10	70	-	-	36	46	14	100	77	162	189	195
10	80	-	-	43	56	14	110	81	182	212	220
10	90	-	-	50	66	14	120	81	204	240	248
10	100	-	-	57	77						
10	110	-	-	65	86	15	50	62	79	84	80
						15	60	74	103	109	111
11	50	-	-	34	37	15	70	91	124	139	137
11	60	-	-	45	48	15	80	109	151	165	169
11	70	-	-	55	62	15	90	126	178	196	197
11	80	-	-	65	74	15	100	142	202	225	230
11	90	-	-	77	89	15	110	157	230	255	259
11	100	-	-	89	102	15	120	173	258	286	292
11	110	-	-	100	116						
12	50	-	34	47	46	16	60	101	123	129	129
12	60	-	41	60	63	16	70	125	149	162	161
						16	80	148	183	193	197

TABLE 5 (continued)

DBH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT- INCHES IB				DBH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT- INCHES IB			
		12.0	10.0	8.0	6.0			12.0	10.0	8.0	6.0
		SV12	SV10	SV8	SV6			SV12	SV10	SV8	SV6
16	90	170	213	230	230	20	90	345	370	375	377
16	100	194	244	262	268	20	100	395	423	435	433
16	110	221	278	299	302	20	110	449	480	489	493
16	120	246	309	333	339	20	120	497	535	549	548
17	60	127	141	149	147	21	70	276	291	289	292
17	70	156	178	186	185	21	80	334	346	356	351
17	80	183	215	224	226	21	90	386	412	413	417
17	90	214	248	265	265	21	100	448	468	481	477
17	100	247	289	303	306	21	110	505	534	539	544
17	110	278	326	345	347	21	120	561	593	607	606
17	120	309	364	383	389	22	70	309	320	319	320
18	60	152	160	170	166	22	80	372	384	391	385
18	70	184	206	210	210	22	90	430	454	456	458
18	80	219	247	256	255	22	100	500	517	529	524
18	90	260	288	300	301	22	110	560	589	594	597
18	100	297	334	346	347	22	120	627	652	667	665
18	110	333	374	392	394	23	70	342	349	349	350
18	120	375	420	437	440	23	80	408	421	427	419
19	60	176	183	191	186	23	90	477	496	498	500
19	70	211	234	235	237	23	100	551	568	577	572
19	80	258	279	288	286	23	110	616	644	650	652
19	90	303	329	337	339	23	120	693	715	727	726
19	100	343	378	390	389	24	70	374	379	380	380
19	110	392	426	440	443	24	80	445	460	463	456
19	120	437	478	492	493	24	90	524	539	542	542
20	60	199	207	213	207	24	100	602	619	626	622
20	70	242	263	261	264	24	110	677	701	706	707
20	80	297	310	322	318	24	120	758	779	789	787

TABLE 6.--ESTIMATED TREE VOLUMES IN BOARD FEET SCRIBNER (SV), BY FORMULA RULE. BASED ON 8-FOOT SCALING LENGTH AND ESTIMATED LOG TOP DIAMETERS INSIDE BARK (CORRESPONDING TO MEASUREMENT OF SCALING DIAMETERS TO "NEAREST INCH"). 3-INCH TRIM PER 8-FOOT LOG. VALUES OMITTED FOR TREES HAVING LESS THAN 8 LINEAL FEET OF MERCHANTABLE BOLE.

DBH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT- INCHES IB				DBH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT- INCHES IB			
		12.0 SV12	10.0 SV10	8.0 SV8	6.0 SV6			12.0 SV12	10.0 SV10	8.0 SV8	6.0 SV6
8	40	-	-	-	15	12	80	-	69	113	127
8	50	-	-	-	20	12	90	-	79	131	147
8	60	-	-	-	24	12	100	-	88	148	167
8	70	-	-	-	29	12	110	-	97	167	187
8	80	-	-	-	35						
8	90	-	-	-	40	13	50	-	63	80	86
8	100	-	-	-	46	13	60	-	78	101	109
						13	70	-	93	122	132
9	40	-	-	-	23	13	80	-	109	143	156
9	50	-	-	16	31	13	90	-	125	166	180
9	60	-	-	18	39	13	100	-	142	189	204
9	70	-	-	21	46	13	110	-	159	212	229
9	80	-	-	23	55	13	120	-	176	235	254
9	90	-	-	25	64						
9	100	-	-	26	72	14	50	52	84	99	103
9	110	-	-	26	81	14	60	61	104	123	130
						14	70	70	125	149	157
10	40	-	-	26	33	14	80	77	146	176	185
10	50	-	-	32	43	14	90	84	169	203	214
10	60	-	-	39	54	14	100	90	191	230	243
10	70	-	-	47	65	14	110	94	215	258	273
10	80	-	-	54	77	14	120	93	239	286	302
10	90	-	-	63	89						
10	100	-	-	71	101	15	50	78	105	118	121
10	110	-	-	80	114	15	60	93	130	147	153
						15	70	110	156	177	185
11	50	-	-	48	57	15	80	128	184	209	217
11	60	-	-	59	71	15	90	145	212	241	251
11	70	-	-	71	85	15	100	163	241	274	285
11	80	-	-	83	101	15	110	181	271	307	319
11	90	-	-	97	117	15	120	199	300	340	354
11	100	-	-	110	133						
11	110	-	-	124	149	16	60	125	157	172	176
						16	70	149	188	208	214
12	50	-	43	64	71	16	80	174	222	244	252
12	60	-	52	80	89	16	90	200	256	281	290
12	70	-	60	96	108	16	100	226	291	319	329

TABLE 6 (continued)

DBH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT- INCHES IB				DBH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT- INCHES IB			
		12.0 SV12	10.0 SV10	8.0 SV8	6.0 SV6			12.0 SV12	10.0 SV10	8.0 SV8	6.0 SV6
16	110	253	325	358	369	20	100	461	501	519	525
16	120	280	361	396	409	20	110	515	560	581	588
						20	120	571	620	642	650
17	60	156	184	198	202	21	70	340	363	373	376
17	70	187	222	239	244	21	80	398	426	438	443
17	80	219	261	281	287	21	90	458	490	505	510
17	90	252	300	323	331	21	100	520	556	572	578
17	100	285	341	367	376	21	110	582	622	640	647
17	110	320	383	410	421	21	120	644	688	708	716
18	60	186	211	224	228	22	70	379	400	409	412
18	70	225	256	271	275	22	80	445	470	482	485
18	80	263	301	318	324	22	90	511	541	555	559
18	90	303	347	367	374	22	100	579	612	628	633
18	100	345	393	416	424	22	110	648	684	702	708
18	110	385	440	466	474	22	120	717	756	776	783
18	120	427	488	515	525						
						23	70	418	438	447	448
19	60	218	240	250	254	23	80	491	515	526	528
19	70	262	290	303	308	23	90	565	592	605	608
19	80	309	342	357	363	23	100	640	671	685	690
19	90	355	394	412	418	23	110	714	749	766	771
19	100	402	447	467	474	23	120	790	828	846	852
19	110	451	500	523	530						
19	120	500	553	578	586	24	70	456	476	485	486
						24	80	538	560	570	572
20	60	250	270	278	282	24	90	619	645	656	659
20	70	300	325	337	342	24	100	701	730	743	747
20	80	352	382	397	402	24	110	783	815	830	835
20	90	407	441	458	464	24	120	864	900	917	922

TABLE 7.--ESTIMATED TREE VOLUMES IN BOARD FEET SCRIBNER (SV) BY FORMULA RULE, BY TREE DBH AND MERCHANTABLE HEIGHT IN 16-FOOT LOGS.
 BASED ON 16-FOOT SCALING LENGTH AND ESTIMATED LOG TOP DIAMETER INSIDE BARK MINUS 1/2 INCH (CORRESPONDING TO "ROUNDING DOWN"
 FRACTIONAL SCALING DIAMETERS TO NEXT LOWER EXACT INCH). 6-INCH TRIM PER 16-FOOT LOG. TABLE DERIVED BY GRAPHICAL METHODS
 FROM TABLES 3 AND 5.

DBH	NO. 16.5- FOOT LOGS	TOP DIAMETER LIMIT - INCHES IB				DBH	NO. 16.5- FOOT LOGS	TOP DIAMETER LIMIT - INCHES IB			
		12.0	10.0	8.0	6.0			12.0	10.0	8.0	6.0
		SV12	SV10	SV8	SV6			SV12	SV10	SV8	SV6
8	1.	-	-	-	10	13	2.5	-	144	111	82
8	1.5	-	-	-	18	13	3.	-	-	137	104
8	2.	-	-	-	25	13	3.5	-	-	164	127
						13	4.	-	-	189	151
9	0.5	-	-	12	-	13	4.5	-	-	-	173
9	1.	-	-	-	-	13	5.	-	-	-	195
9	1.5	-	-	-	22	14	1.	78	-	-	-
9	2.	-	-	-	30	14	1.5	-	91	-	-
9	2.5	-	-	-	42	14	2.	-	124	89	-
9	3.	-	-	-	52	14	2.5	-	160	123	93
10	1.	-	-	26	-	14	3.	-	194	154	118
10	1.5	-	-	44	25	14	3.5	-	-	185	147
10	2.	-	-	59	36	14	4.	-	-	214	173
10	2.5	-	-	-	51	14	4.5	-	-	-	201
10	3.	-	-	-	64	14	5.	-	-	-	227
10	3.5	-	-	-	77	15	1.	79	-	-	-
						15	1.5	128	96	-	-
11	1.5	-	-	49	-	15	2.	170	134	101	-
11	2.	-	-	67	44	15	2.5	-	176	137	105
11	2.5	-	-	87	59	15	3.	-	214	171	134
11	3.	-	-	-	76	15	3.5	-	254	207	166
11	3.5	-	-	-	93	15	4.	-	241	196	-
11	4.	-	-	-	108	15	4.5	-	-	277	229
12	1.	-	48	-	-	15	5.	-	-	-	258
12	1.5	-	-	53	-	15	5.5	-	-	-	291
12	2.	-	-	74	50						
12	2.5	-	-	99	71	16	1.5	135	-	-	-
12	3.	-	-	120	90	16	2.	183	144	-	-
12	3.5	-	-	-	109	16	2.5	233	190	150	-
12	4.	-	-	-	128	16	3.	-	234	189	152
12	4.5	-	-	-	148	16	3.5	-	278	231	187
						16	4.	-	-	267	222
13	1.	-	50	-	-	16	4.5	-	-	308	259
13	1.5	-	84	59	-	15	5.	-	-	-	293
13	2.	-	114	83	56	16	5.5	-	-	-	329

TABLE 7 (continued)

DBR	NO. 16.5- FOOT LOGS	TOP DIAMETER LIMIT - INCHES IB				DBH	NO. 16.5- FOOT LOGS	TOP DIAMETER LIMIT - INCHES IB			
		12.0	10.0	8.0	6.0			12.0	10.0	8.0	6.0
		SV12	SV10	SV8	SV6			SV12	SV10	SV8	SV6
17	1.5	143	-	-	-	21	2.5	325	-	-	-
17	2.	195	155	-	-	21	3.	393	340	287	-
17	2.5	253	207	164	-	21	3.5	475	413	356	304
17	3.	303	253	208	169	21	4.	545	479	413	362
17	3.5	-	303	253	209	21	4.5	-	551	484	424
17	4.	-	350	295	249	21	5.	-	-	540	480
17	4.5	-	-	341	289	21	5.5	-	-	609	543
17	5.	-	-	382	329	21	6.	-	-	-	607
17	5.5	-	-	-	369						
18	1.5	151	-	-	-	22	2.5	346	-	-	-
18	2.	208	162	-	-	22	3.	423	364	313	-
18	2.5	271	221	179	-	22	3.5	506	442	383	330
18	3.	326	276	227	187	22	4.	581	512	449	392
18	3.5	-	331	277	232	22	4.5	-	588	522	460
18	4.	-	380	325	276	22	5.	-	656	585	521
18	4.5	-	-	375	322	22	5.5	-	-	650	590
18	5.	-	-	423	366	22	6.	-	-	-	652
18	5.5	-	-	-	410						
19	2.	218	-	-	-	23	2.5	365	-	-	-
19	2.5	290	238	195	-	23	3.	450	388	-	-
19	3.	349	297	247	206	23	3.5	536	469	410	355
19	3.5	415	356	301	255	23	4.	616	549	482	421
19	4.	-	413	353	304	23	4.5	708	628	561	497
19	4.5	-	472	410	354	23	5.	-	711	633	564
19	5.	-	-	461	404	23	5.5	-	-	707	637
19	5.5	-	-	-	454	23	6.	-	-	-	707
20	2.	232	-	-	-	24	2.5	383	-	-	-
20	2.5	308	255	210	-	24	3.	474	411	-	-
20	3.	376	316	267	225	24	3.5	565	499	437	383
20	3.5	444	384	328	280	24	4.	656	584	517	454
20	4.	506	446	385	334	24	4.5	746	668	600	534
20	4.5	-	508	447	389	24	5.	-	751	677	609
20	5.	-	-	501	442	24	5.5	-	-	756	686
20	5.5	-	-	-	498	24	6.	-	-	-	759

TABLE 8.--ESTIMATED TREE VOLUMES IN BOARD FEET INTERNATIONAL 1/4-INCH RULE (IV), BASED ON 16-FOOT SCALING LENGTH (EXCEPT TOP LOGS) AND ESTIMATED LOG TOP DIAMETERS INSIDE BARK (CORRESPONDING TO MEASUREMENT OF SCALING DIAMETERS TO "NEAREST INCH"). 6-INCH TRIM ALLOWANCE PER 16-FOOT LOG. VALUES OMITTED FOR TREES HAVING LESS THAN 8 LINEAL FEET OF MERCHANTABLE BOLE.

DBH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT -INCHES IB				DBH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT -INCHES IB			
		12.0 IV12	10.0 IV10	8.0 IV8	6.0 IV6			12.0 IV12	10.0 IV10	8.0 IV8	6.0 IV6
8	40	-	-	-	17	12	90	-	85	143	162
8	50	-	-	-	23	12	100	-	96	165	186
8	60	-	-	-	30	12	110	-	107	186	212
8	70	-	-	-	37						
8	80	-	-	-	45	13	50	-	61	80	81
8	90	-	-	-	52	13	60	-	79	103	110
8	100	-	-	-	59	13	70	-	97	126	137
						13	80	-	116	153	165
9	40	-	-	-	24	13	90	-	136	179	195
9	50	-	-	18	34	13	100	-	154	205	223
9	60	-	-	21	44	13	110	-	174	232	252
9	70	-	-	24	55	13	120	-	194	260	282
9	80	-	-	26	66						
9	90	-	-	30	77	14	50	53	80	95	96
9	100	-	-	32	89	14	60	62	104	121	130
9	110	-	-	32	101	14	70	74	128	153	159
						14	80	82	153	185	194
10	40	-	-	26	32	14	90	90	178	214	227
10	50	-	-	34	46	14	100	97	206	247	261
10	60	-	-	42	59	14	110	101	234	279	296
10	70	-	-	52	74	14	120	101	259	312	330
10	80	-	-	61	88						
10	90	-	-	72	104	15	50	77	100	110	111
10	100	-	-	83	120	15	60	92	130	143	149
10	110	-	-	94	136	15	70	111	159	180	184
						15	80	132	189	214	224
11	50	-	-	48	58	15	90	151	223	252	261
11	60	-	-	63	75	15	100	172	256	291	302
11	70	-	-	77	94	15	110	194	288	327	341
11	80	-	-	93	112	15	120	214	323	366	382
11	90	-	-	108	132						
11	100	-	-	125	153	16	60	122	152	165	169
11	110	-	-	142	172	16	70	150	187	207	210
						16	80	179	226	246	255
12	50	-	43	64	70	16	90	208	267	292	298
12	60	-	54	83	92	16	100	236	303	333	344
12	70	-	64	102	114	16	110	267	345	377	389
12	80	-	74	122	138	16	120	298	385	422	435

TABLE 8 (continued)

DBH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT -INCHES IB				DBH	TREE TOTAL HEIGHT	TOP DIAMETER LIMIT -INCHES IB			
		12.0	10.0	8.0	6.0			12.0	10.0	8.0	6.0
		IV12	IV10	IV8	IV6			IV12	IV10	IV8	IV6
17	60	152	177	188	190	21	70	325	347	351	355
17	70	187	219	236	237	21	80	393	413	428	427
17	80	222	264	281	287	21	90	456	489	498	504
17	90	258	307	331	336	21	100	525	558	576	577
17	100	296	354	378	388	21	110	592	632	647	656
17	110	338	402	430	438	21	120	659	705	726	729
17	120	374	446	478	491						
18	60	182	198	211	213						
18	70	223	251	263	266	22	70	361	379	383	387
18	80	263	300	317	322	22	80	434	454	466	464
18	90	309	351	373	377	22	90	504	535	543	548
18	100	354	405	426	434	22	100	581	610	628	628
18	110	400	456	482	491	22	110	656	693	706	714
18	120	447	509	537	548	22	120	732	769	790	794
19	60	209	223	235	235						
19	70	254	282	291	295	23	70	397	413	415	418
19	80	307	339	353	358	23	80	477	495	505	502
19	90	360	396	413	418	23	90	555	581	590	595
19	100	410	456	475	481	23	100	639	665	680	680
19	110	465	513	537	544	23	110	713	754	766	772
19	120	518	574	599	606	23	120	802	837	856	859
20	60	238	250	260	258						
20	70	289	315	320	325	24	70	432	445	449	451
20	80	349	374	390	391	24	80	518	537	544	541
20	90	410	442	455	461	24	90	606	630	637	641
20	100	467	507	524	528	24	100	695	720	733	734
20	110	530	572	592	599	24	110	783	814	827	832
20	120	589	638	661	666	24	120	875	906	922	926

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